# Application of Intelligent Technologies in Risk Management in the Financial Industry

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**Abstract.** In the context of rapid globalization and information technology advancements, the deep integration of intelligent technologies in the financial sector has become a driving force for the innovation of risk management systems and business operations. This paper focuses on the application of intelligent risk control (risk tech) technologies in commercial banks' risk management, aiming to comprehensively analyze the benefits and challenges it brings. The study also explores how scientific and reasonable risk management strategies can promote technological innovation in the financial industry and the dual improvement of policies and technologies. Through detailed analysis, this research reveals that intelligent risk control technologies not only reshape the risk management frameworks of financial institutions but also open new pathways for the innovation and development of financial services. In particular, in data-driven decision-making processes, intelligent risk control technologies enhance business processing efficiency and security through full-chain automation, effectively reducing the probability of risk events and the resulting losses.

**Keywords:** FinTech, Intelligent Risk Control Technology, Risk Assessment Models

## 1 Introduction

In today's rapidly evolving globalized and information-driven era, the popularization of internet and big data technologies has profoundly changed the financial industry, particularly in commercial banking's risk management and business innovation models. Intelligent risk control technology, integrating the internet, big data, artificial intelligence, and other advanced technologies, has significantly improved the efficiency and precision of risk management while reducing operational costs. This allows financial institutions to respond more agilely to complex financial markets. In recent years, several government policies have provided strong support for the regulatory and intelligent development of the intelligent risk control industry, promoting its widespread application in the financial sector.

When discussing the economic challenges faced by global financial institutions, the associated economic losses and risk control management costs must be addressed. Latest data shows that in 2020, global financial institutions suffered direct economic losses


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amounting to $32.1 billion due to violations, fraud, and data breaches. Additionally, the proportion of risk management costs in total expenditures has risen to 4.1%. This backdrop highlights the strong growth momentum in the anti-fraud technology market, with its market size reaching $12.5 billion, reflecting the urgent need for efficient risk control technologies. Furthermore, by 2021, the global smart compliance technology market grew to $15.7 billion, signaling that intelligent risk control technologies are gradually becoming the mainstream trend in the industry. The problem of non-performing loans in China's banking sector remains severe, with total non-performing loans reaching 3.4 trillion yuan in 2024 and a non-performing loan ratio of 1.56 percent, according to data from the Banking and Insurance Regulatory Commission [1]. These data not only reveal the challenges faced by the banking industry in liquidity, credit, market, and operational risks, but also emphasize the urgency of strengthening modern risk management.

Therefore, this paper uses methods such as literature review, quantitative and qualitative analysis, and case studies to examine the application, benefits, and challenges of intelligent risk control technologies in commercial bank risk management. It provides scientific risk management strategies for commercial banks and contributes to the technological innovation and the improvement of relevant policies and technologies in financial industry risk management.

## 2 Literature Review

With the rapid development of financial markets and the increasing volume of banking financial business, risk control management capabilities have become a key component of banks' core competitiveness. Xue Jintao (2024) emphasizes that risk control management is essential for the stable and healthy development of commercial banks [2]. Its importance is not only reflected in safeguarding asset quality but also directly impacts the overall stability and prosperity of the financial industry. Effective risk management mechanisms significantly improve the operational efficiency of commercial banks, laying a solid foundation for the continuous development of the social economy. In this context, intelligent technology, as an advanced information tool, is gradually penetrating into risk control management in bank financial services. Xu Zhexian (2023) points out that intelligent technology demonstrates significant potential in risk assessment, anti-fraud control, predictive model construction, product recommendation optimization, business analysis, and risk control, effectively enhancing the efficiency and accuracy of bank risk management [1].

In terms of market application, intelligent risk control technology has been widely applied in various fields, such as domestic finance and the internet. Internationally, intelligent risk control has become a key means to address the increasingly complex financial risk environment, receiving extensive attention and research. In recent years, with the rapid development of big data, artificial intelligence, and blockchain technologies, intelligent risk control systems have made significant progress in foreign financial industries. The United States, as a pioneer in financial technology, has seen prominent developments in its intelligent risk control systems. International investment

banks, such as Goldman Sachs, have achieved electronic and automated trading through technology and built internal risk management tools like SecDB. These rely on big data and machine learning algorithms to provide multidimensional data support for risk analysis. Additionally, JPMorgan Chase has invested heavily in financial technology, focusing on the development and application of new technologies, demonstrating its commitment and capabilities in intelligent risk control. In Europe, the development of financial technology risk control systems has also been rapid, with a strong emphasis on compliance and privacy protection.

Despite the significant progress of modern intelligent risk control technologies in the financial industry, there are still limitations in practical application. In terms of data management, many banks continue to use outdated vertical data resource management models, storing vast amounts of data in the independent systems of various business departments [3]. In business risk identification and analysis, current technologies and methods also exhibit notable deficiencies. Many banks' risk management practices remain superficial, relying on data mining and statistical analysis without delving into the hidden patterns and correlations behind the data [4].

# 3 Case Study

## 3.1 Introduction to Bangsheng Technology

Zhejiang Bangsheng Technology Co., Ltd. (referred to as "Bangsheng Technology") was founded in 2010 and is a high-tech enterprise in China's financial real-time risk control field. Its client base spans across banks, securities, insurance, and internet lending, among others, and the company has established partnerships with nearly 100 well-known enterprises across different industries. Bangsheng Technology focuses on the financial real-time risk control field, with its team of business and technical experts constructing a central real-time risk prevention system and internet credit system. Relying on high-performance solutions centered around real-time financial risk monitoring, the company occupies an important position in the financial real-time risk control sector.

To further strengthen its interactive network and after-sales service system, Bangsheng Technology plans to develop a new real-time intelligent analysis and processing platform. While deeply cultivating the financial sector, the company will also expand the application scenarios of its core product, "Liu Lifang," to non-financial fields, including aerospace, military defense, and anti-terrorism security.

Bangsheng Technology has built a comprehensive system in the financial real-time anti-fraud field, integrating multiple dimensions such as platform, product, technology, data, and rules. The core highlight of this system is its millisecond-level central risk control system, which can identify and block fraudulent transactions within milliseconds by analyzing customer transaction behaviors in real time, using big data and machine learning algorithms. Additionally, Bangsheng Technology offers professional anti-fraud products and services, such as anti-fraud systems and risk monitoring platforms, providing comprehensive anti-fraud solutions for financial institutions.

In terms of the internet credit, Bangsheng Technology utilizes advanced machine learning techniques and big data analysis capabilities to build a comprehensive credit risk management system based on differentiated customer behavior scoring models throughout the entire lifecycle. This system can accurately profile and credit-score customers based on multi-dimensional information such as their historical behavior, credit records, and other factors. Additionally, by continuously monitoring changes in customer credit behavior, it can promptly identify potential risks and take corresponding actions, achieving comprehensive lifecycle management of credit risk. This system not only improves the credit granting efficiency of financial institutions but also reduces credit risk, providing strong support for the stable development of these institutions.

Bangsheng Technology has also made significant achievements in the field of machine learning. Their one-stop deployment and real-time intelligent decision-making platform integrates various tools, including models, intelligent scorecards, and smart rules, to provide financial institutions with efficient and intelligent decision support. The platform can analyze customer data in real-time, quickly generate decision results, and automatically adjust strategies to adapt to market changes. Furthermore, Bangsheng Technology offers professional machine learning modeling and consulting services to help financial institutions build and optimize machine learning models, enhancing business efficiency and accuracy.

In the field of intelligent securities products, Bangsheng Technology, relying on its ultra-high-performance quantitative computing platform, has developed leading intelligent applications and decision-making products. These products can analyze market data in real-time, quickly identify trading opportunities and risk points, and provide investors with accurate investment advice and risk management solutions. At the same time, Bangsheng Technology also offers an intelligent trading platform and services to help investors achieve efficient and convenient securities trading operations.

## 3.2 Application of Intelligent Technology in Bangsheng Technology's Risk Management

Bangsheng Technology's intelligent technology in risk management primarily manifests in its advanced machine learning and big data analytics capabilities, which help the company quickly identify potential risks and conduct precise assessments.

Specifically, Bangsheng Technology’s intelligent operational risk control system utilizes advanced big data analysis and artificial intelligence technologies to build a comprehensive risk monitoring system from T+1 to real-time, aiming to improve the efficiency and accuracy of bank operational risk control. The system, based on regulatory requirements and internal control norms, effectively manages account risks such as gambling and fraud activities, as well as employee misconduct through a feature indicator system accumulated from long-term business experience. The technical features include hybrid computing technology combining batch and real-time processing, and time-series computing for complex event analysis, improving the speed and accuracy of risk identification. Additionally, integrated graph computing technology helps identify risks in complex network relationships, enabling precise early warnings and risk checks.

In the financial sector, credit risk management during the loan process is crucial, especially in internet credit, credit card centers, consumer finance, and inclusive finance scenarios. Bangsheng Technology's loan risk control service utilizes behavioral scoring models, which dynamically assess a customer's default risk based on their behavior during the account usage period. This model, relying on customer behavioral data, predicts the probability of severe arrears risk within a future time period, enabling early risk warnings and credit limit management. At the same time, risk warning strategies, using credit scores and other quantitative indicators, segment customers into different risk groups and apply differentiated monitoring strategies to optimize resource allocation. In terms of credit limit management, the system dynamically adjusts credit limits based on the borrower's credit lifecycle and behavioral characteristics, aiming to meet customer needs while improving asset quality. The pricing adjustment strategy combines customer group operating costs, market conditions, and risk assessments to implement differentiated pricing, achieving a balance between risk and return. The implementation of these strategies not only reduces the cost of asset disposal but also enhances the profitability of financial institutions, promoting the realization of refined operations.

Furthermore, its real-time big data processing technology plays a key role in real-time risk control. This technology can process millions of data inputs with millisecond-level latency, breaking through traditional data processing bottlenecks. The application of this technology not only improves the processing capacity and response speed of the risk control system but also ensures the continuity and security of financial transactions. The address fuzzy matching technology, through standardized databases and algorithms, verifies the authenticity of customer addresses, effectively improving the accuracy and efficiency of risk identification [5].

Through these specific technological applications, Bangsheng Technology can provide financial institutions with precise risk management and decision-making support, ensuring the safety and stability of financial operations, thereby supporting its industry-leading position in the financial technology field. This also demonstrates the crucial role of intelligent technology in risk management, reflecting the direct impact of technological innovation on improving financial service efficiency and security.

# 4 Solutions

## 4.1 Intelligent Internal Control Framework

In exploring intelligent solutions for bank customer credit risk management, this research propose a comprehensive and innovative intelligent internal control framework. As shown in figure 1, this framework meticulously covers the entire lifecycle of credit business, from pre-loan, loan, to post-loan stages, and deeply analyzes the complex risk environment faced by corporate and small and micro clients.

In the pre-loan, loan, and post-loan stages, this solution has been meticulously planned and implemented. During the pre-loan stage, we have outlined the necessary data collection and integration paths for related approval processes, including but not

limited to comprehensive collection of business operation information, in-depth analysis of financial and funding status, and real-time tracking of industry development trends. In the loan stage, we ensure the completeness and accuracy of the materials required for credit approval and dynamically adjust the credit limit based on real-time data to ensure the rationality of the credit issuance. During the post-loan stage, we achieve comprehensive monitoring of loan issuance, including repayment status, fund flows, and other factors, and formulate corresponding risk control measures for potential endogenous and exogenous risks.

The core goal of this solution is to build a comprehensive and efficient pre-loan risk management mechanism that accurately identifies potential fraud behaviors and screens out customers with insufficient repayment ability, significantly reducing the overdue bad debt risk faced by financial institutions. Additionally, by optimizing the management processes in the loan and post-loan stages, we aim to reduce unnecessary management costs and provide strong support for the safe operation and stable development of bank credit businesses.

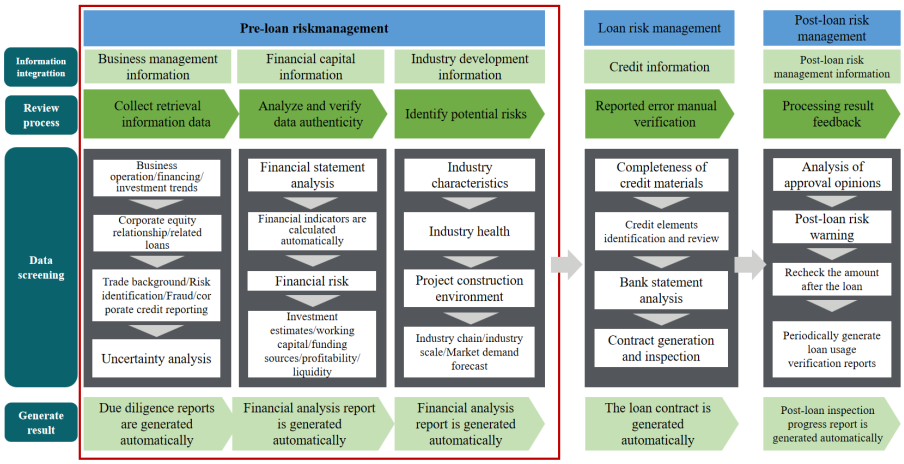


**Fig. 1.** Intelligent Internal Control Framework

## 4.2 Revenue and Risk Analysis

The intelligent risk control system, with its exceptional data collection and integration capabilities, creates a comprehensive and precise risk management panoramic view for the banking industry. The system automatically aggregates and integrates multidimensional information from the market, exchange regulations, and the bank's internal data, providing banks with unprecedented market insights. It allows them to more keenly identify, accurately assess, and effectively respond to various potential market risks. Most importantly, the intelligent internal control system, with its powerful real-time data analysis functions, can quickly identify potential risks in various complex scenarios and issue warning signals, greatly enhancing a bank's ability to respond to and handle market risks.

The real-time risk alerts and flexible response mechanisms of the intelligent risk control system can continuously track key risk indicators and rapidly changing market dynamics, effectively reducing financial losses caused by risk events, while significantly decreasing the occurrence of false positives. Additionally, the system can intelligently learn from the actual operational effects and continuously optimize and improve its decision-making mechanisms, ensuring that risk management measures closely align with the latest market changes.

Through these advanced features, the intelligent internal control system successfully breaks through traditional information barriers, quantifies risk assessments, and establishes a direct risk report system, ensuring that risk information is rapidly and accurately communicated to decision-makers. In today's era of information explosion, data has become a key engine driving the development of bank businesses. The intelligent internal control system can extract critical information from vast amounts of data, injecting unprecedented efficiency and precision into the bank's decision-making process. At the same time, leveraging advanced analysis models and algorithms, the system can accurately predict market trends and identify potential risks, providing strong support for the bank's stable operations.

## 5 Research Conclusion

In this study, we explored the application of intelligent technology in risk management within the financial industry and analyzed how these technologies help commercial banks address the increasingly complex financial markets. Through a review of literature and quantitative and qualitative analyses, we studied in detail how intelligent risk control technologies reshape the risk management architecture of financial institutions, especially how they enhance the efficiency and security of business processing, as well as effectively reduce the occurrence of risk events. At the same time, this study constructed an intelligent internal control framework covering the entire lifecycle of credit business, optimizing the performance of traditional risk control systems, and opening new paths for innovation and development in financial services. In conclusion, intelligent technology has become an important driving force for modernizing risk management in the financial industry, signaling the mainstream development trend in the financial technology field.

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